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**DRAWINGS:**

The attached sheet (sheet 1/20) of drawings includes changes to Figure 1, and replaces the original sheet 1/20 with Figures 1, 2 and 3. In Figure 1, previously omitted reference numbers 1001, 1002, 1003 and 1004 have been added. A copy of sheet 1/20 is faxed along with this Amendment, and a new copy will be mailed separately.

**REMARKS:****General**

By the above amendment the Applicant has amended the claims to comply with objections in sections 2, 3 and 4 of the Office Action. Amendments also serve the purpose to more clearly show the nature of the invention with respect to prior art.

The Office Action considers the invention unpatentable over Pagallo US 5,544,262. In what follows, a detailed analysis of objections in section 5 is performed to show the novelty and nonobviousness of the invention over the Pagallo patent.

Also, a brief discussion on the references cited by the Examiner and not relied upon is performed next.

Finally, some additional references that have become known to Applicant are analyzed next.

In particular, a detailed analysis of US patent 5,471,613 is carried out next. The advantages of the current application over US patent 5,471,613 are shown. Claims 1, 19, 43 and 44 have been amended in order to more clearly show the differences between the current patent application and US patent 5,471,613.

Some claims have been amended to fulfil the requirements defined by the Office Action.

Also, some claims have been amended to better emphasize the differences between the current patent and the prior art.

The specification and sheet 1/20 of the drawings have also been amended to facilitate the new wording of claims 1 and 19.

**Actual amendments performed**

This section is intended that this section is intended to facilitate understanding the relationship between the remarks and the actual amendments performed upon the claims.

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With that purpose, the section schematically describes what amendments have been done on the different claims as required by the objections of the Office Actions and to better define the invention over prior art.

**Claim 1**

Adding text that describes computer system parts

Eliminating indefinite word "might"

Refining the characteristics of the tree to more clearly define the invention over prior art.

**Claim 2**

Eliminating indefinite words "might" and "another type of action"

**Claim 19**

Eliminating indefinite word "might"

Refining the characteristics of the tree to more clearly define the invention over prior art.

**Claim 20**

Eliminating indefinite word "might" and "another type of action"

**Claim 40**

Eliminating indefinite word "and"

**Claim 43**

Rewording the claim to link it to claim 19 in order to facilitate exposition of the invention.

**Claim 44**

Rewording the claim to link it to claim 19 in order to facilitate exposition of the invention.

**Remarks according to Objection 2**

(This objection indicated that the word "Reivindicaciones" is not English, and rejected several claims due to wrong indentation and due to indefinite word "and" in claim 40.)

The word "Reivindicaciones" has been removed in the new claim set.

The indentation of claim 4-7 has been corrected as required.

The word "and" at the end of claim 40 has been removed as required.

#### **Remarks according to Objection 3**

(This objection rejected several claims because they contained indefinite words)

Claim 1 has been corrected.

Claims 1, 2, 19, 20 and 43 have been corrected to remove indefinite words as required.

#### **Remarks according to Objection 4**

(This objection rejected several claims as directed to non-statutory subject matter)

Claim 1 has been corrected, adding computer subelements, in order to make the claim invention statutory subject matter. Claims 2, 4-7, 10-12, 16 and 40-41, being dependent claims, are also to be considered as directed to statutory subject matter.

#### **Remarks according to Objection 5**

(This objection rejected several claims as unpatentable over Pagallo, US 5,544,262)

Applicant considers that the Pagallo patent should not be the basis for rejecting the current patent application. The main reasoning is that the Pagallo patent is intended to work with formulas in a general way, but not showing any tree-form representation of the formulas for assisting the user.

In what follows, a detailed analysis of the patent application and of the Pagallo patent is performed, to better show the novelty of the invention with respect to the Pagallo patent.

#### **Objections regarding Claim 1**

The objections to Claim 1 will be analyzed in more detailed, given that it is the independent claim.

- a. 'graphics button' in Pagallo (col 8, lines 6-15) is "means for showing one or more graphical representations" v current patent application.

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Applicant considers that the 'graphics button' in Pagallo is not related to any action on graphical trees. The Pagallo patent only mentions the existence of the button, but does not explain what it is used for. The most likely possibility is for changing the editing mode of the handheld device. It is known that tactile displays in handheld devices can operate in two modes.

- In one mode (keyboard mode), characters are inputted by pressing keys that are shown on the display.
- In a second mode (graphical mode) the user handwrites different characters, and some character recognition software identifies the characters.

Therefore, the most likely function for the graphics button is switching between those two modes.

There is no indication in the Pagallo patent that suggests that the button is used for creating a graphical representation of the equations in the form of a tree.

b. 'tree structure representation' in Pagallo (abstract and col 11 lines 30-43) is "graphical representation entity showing calculation expression in tree form".

Despite the invention in the Pagallo patent makes use of trees to analyze the equations, these tree representations are not shown in graphical form to the user, nor they are used for assisting the user to create equations.

The trees are internally created by parsing the equation entered by the user (col 3, line 60) and it is used for the computer system to internally analyze the equations. In fact, col 11 rows 40-42 state that "The tree structured representation provides a logical organization of the data for the data manipulation system", but all this process is carried out internally, by the processor of the handheld device.

This is more clearly indicated in Pagallo in col 24 lines 59-67, and col 25 lines 1-17. Those paragraphs indicate that the parsed tree is just an internal construct of the computer. For example, in col 25 line 4, it is indicated that when the user changes a "3" into a "33", the system "edits" (quotation marks in the original) the parsed tree replacing the value "3" with a "33" value. The quotation marks are intended to mean that that "edit" action in the parsed tree is internally generated.

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Furthermore, Figures 13a, 13b and 13c are schematically shown, and lack any characteristic that might suggest that they are ever shown to the user.

c. 'graphics button displaying different graphical representation' in Pagallo (col 8, lines 6-15) is "different types of arboreal graphical representations"

This objection is similar to objection (a) to this claim, as it refers to the same text in the Pagallo patent.

There is no indication in the Pagallo document that suggests that a tree representation of the equation is shown to the user at any time, nor in the text or in any of the drawings.

After reviewing the Objections to Claim 1, being the independent claim, Applicant believes that the objections to Claim 2 should be interpreted in a different way. However, an analysis of the objections will also be performed in what follows.

#### **Objections regarding Claim 2**

##### Abstract and col 24, lines 32-58.

In general, the editing described in the Pagallo patent refers to the problem of recognizing equations as manually written in a tactile display (such as in Figure 2 in Pagallo). In this environment, there are uncertainties as to the position of the different elements of the equation. The patent is directed to solve the problems created by those uncertainties.

However, those uncertainties do not exist in the current patent application. What is claimed in the current patent is directed to defining and understanding the structure of expressions. Recognizing the characters used for that purpose is not a problem in the current patent application..

#### **Objections regarding Claim 4**

##### Figure 10

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Figure 10 (and Figures 13a, b and c) show various tree structures that are used in the Pagallo patent.

However, there are two important differences with the current application:

- The tree in the Pagallo patent are used for internal computation purposes, and not for assisting the user to build expressions.
- The nodes of the tree in Pagallo are different from the nodes in the trees in the current application. This can be seen in the Figures in the current application. Also, claim 1 has been amended and it is more clearly shown now.

#### **Objections regarding Claim 5**

##### Col 8, lines 6-15

As discussed about Claim 1, the 'graphic button' in Pagallo is not related to creating graphical trees. Also, the reasoning given in the previous section (about the objections to claim 4) apply here.

#### **Objections regarding Claim 6**

##### Col 8, lines 6-15

The reasoning given in the previous section (about the objections to claim 5) apply here.

#### **Objections regarding Claim 7**

##### Col 8, lines 6-15

The reasoning given in the previous section (about the objections to claim 5) apply here.

#### **Objections regarding Claim 10**

##### Col 2, lines 19-30, and col 24 lines 32-58

Applicant believes that what is disclosed in the Pagallo patent is intended for the internal mechanisms of the computer

- to assure that equations are structurally correct, and
- for updating equations without having to reparsing the tree that represents the equation

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On the other hand, what is claimed in the current patent application is related to modifying the structure of a tree-form graphic representation to make the expression more easily understood by the user directly. In particular, it is intended to help users that might be confused when they utilize operators that have a different priority level.

For example, a user might be confused with the expression " $x + y * z$ ", and might erroneously think that its meaning is the same as " $(x + y)*z$ ".

The Pagallo patent refers to different problems:

- In col 2, lines 19-30, the Pagallo document refers to incorrect structures such as " $x + *$   $y$ ", where there are two operators adjacent to each other.
- In col 24 lines 32-58, the Pagallo document is referring to updating the parsed tree without reparsing the equation.

### **Objections regarding Claim 11**

#### Col 11, lines 30-65

In this part, the Pagallo patent is describing how the parser works in relation with valid expressions.

#### Col 14 lines 55-66

In this part, the Pagallo patent introduces the role of constrained attribute grammars. However, Claim 11 in the current patent application is intended to require modifications of otherwise correct mathematical expressions, to facilitate its interpretation to non expert users.

### **Objections regarding Claim 12**

#### Col 11, lines 30-65

In this part, Pagallo broadly describes how the parser works, but does not mention for a text to be added to any node of the parsed tree.

#### Col 14, lines 55-66

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In this part, Pagallo provides information about the utilization of a constrained attribute grammar for recognizing the mathematical equation, which is a required step for parsing the expression. It does not mention for a text to be added to any node of the parsed tree.

Col 24, lines 24-31

In this part, Pagallo describes how a parsed tree can be evaluated in order to obtain the result of the mathematical expression. It does not mention for a text to be added to any node of the parsed tree.

As a summary, Applicant considers that the Pagallo patent does not disclose the utilization of a descriptive text together with the tree representation of the mathematical expression. In fact adding text would not be useful, since the parsed tree is not shown to the user.

**Objections regarding Claim 16**

Col 4, lines 1-15

Pagallo does not describe the utilization of any graphical representation of a parsed tree, and therefore expanding and collapsing nodes is not described there.

**Objections regarding Claim 40**

Col 4, lines 15-58

In this part, Pagallo describes the production rules for the grammar that are used to manipulate the equations, but it does not discloses the partial evaluation of the parsed tree.

**Objections regarding Claim 41**

Col 9, lines 66-67 and col 10, lines 1-31

In this part, Pagallo describes how the equation inputted by the user is recognized to create the parsed tree. However, claim 41 claims the opposite conversion, which is to use a tree and convert it into an expression, that might be mathematical.

**Objections regarding Claims 43 and 44**

In a telephone conversation between Applicant and the Examiner, claims 43 and 44 were considered correct.

**Remarks on references cited in the Office Action but not relied upon**

In this section, a brief analysis will be performed on the references mentioned in the Conclusion of the Office Action.

**Reference 1. US Patent 7,181,068**

The scope of this patent is character recognition in the domain of mathematical formulae. Character recognition is not part of the current patent application, therefore Applicant considers that this reference should not influence the evaluation of the current patent application.

**Reference 2. US Patent 5,559,939**

The scope of this patent is editing formulas for placing them in documents. However, it does not use graphical representations of the formulas in tree form. It uses some trees, but for internal computation of the steps that are required to be performed.

**Reference 3 US Patent 6,610,106**

The goal of this patent is similar to the goal of patent 5,559,939. It also uses trees, but only for internal computation, and it does not show any tree representation for assisting the user to develop expressions.

**Reference 4 US Patent 5,745,878**

This patent does not seem to be directed to creating calculation expressions

**Reference 5 GB Patent 2,354,849**

The purpose of this patent is to build database queries, and it uses graphically displayed trees. However, the trees are used to show the relationships between different concepts, and not to clarify the effect of different operators.

**Reference 6 "Understanding Mathematical Expression from Document Image", Ha et al.**

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This reference uses trees to analyze and understand mathematical expressions. However, the trees are only used as an internal construct in the computer process. They are not graphically displayed to assist the user to understand expressions or build better ones.

**Reference 7 "A problem generator to learn expression evaluation in CSI and its effectiveness", Krishna et al.**

This reference uses some tree-like structures to help users better understand mathematical expressions. These structures are similar to some structures disclosed in the current patent application. However, these structures are not claimed, so this reference should have no effect on the current patent application.

**Remarks on additional References**

Some other references have become known to Applicant in the last months that share some characteristics with the current application. Below they are briefly analyzed and the advantages of the current application are shown.

**US Patent 5471613**

This was the patent originally mentioned, because it has certain resemblance with the current patent application. In point 2 a close comparison is done between both patents that show the important differences that exist between them.

**US Patent 5421008**

This patent uses the same approach as US5471613, and in fact it is closely related to it. Patent US5471613 is analyzed in more depth in the next section.

**EP Patent 1286276**

In this patent they use tree decomposition of certain parts of the SQL query in order to create the full SQL query. The main difference with the current patent application is that they have not realized that a tree decomposition can also be applied to the boolean expression in the "where" part of the query.

**EP Patent 0616289**

This patent is also directed to facilitate the creation of boolean expressions using graphs. The problem they try solve is the same problem that is approached in the current patent application, but the methodology is different. This is one example of many patents that try to solve this problem, which has gained much importance with the growth in database and Internet utilization.

**US Patent 6326962**

This is another patent that tries to solve the same problem. It shares many elements with US 5471613 and EP 0616289, and because of that here it will not be discussed further.

**US Patent 6263328**

This patent is intended to simplify the process of the formulation and execution of complex database queries. At some point, they use a tree decomposition of the query (Fig 19A and Fig 15B) . This decomposition is very similar to the one done in US5471613, and due to that it will not be discussed further. What is said in point 2 about US5471613 can be extended to this patent.

**US Patent Application 2004/0210819**

This patent is also intended to solve the problem of easy query formulation, but takes a very different approach.

It can be seen that many patents (these and many more) aim at solving the same problem: the difficulty of query formulation, mainly coming from complex boolean expressions.

US 5471613 is probably the one that gets closer to the solution, but it still is difficult to use. The next section will explain this in more detail.

**A detailed comparison between the current application and US Patent 5471613**

In order to perform the comparison between US 5471616 and the current patent application, the “WHERE” fragment of an example query will be created utilizing each

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approach. The fragment is taken from the current patent application, and is shown here in Exhibit 1.

**Exhibit 1**

Style=Essay AND ((Orientation=History AND NOT Year<1990) OR  
(Orientation=biography AND NOT Year<1995)) AND (Topic=Business AND NOT  
(Topic=Accounting OR Topic=Finance) AND ((Language=English OR  
(Language=French AND Year>2000) OR (Language=Russian AND Year>2002)))

Exhibit 2 shows the tree of the expression as created with the invention of the current patent application. Exhibit 3 shows the tree of the expression according to patent US 5471613. In applicant's view, the approach taken by the current patent application is very different, and it provides a much easier process to create and understand the expression. Bes

As can be seen, for each node, it is quite difficult to see the expression that corresponds to each node, unless we are in the nodes closest to the end of the branches.

Furthermore, the approach disclosed in the current patent application provides further understanding by allowing easy expanding/collapsing of the tree nodes, which patent US5471613 does not.

The approach used by the US5471613 patent is very usual among engineers and computer scientists: put the operator after the predicates and linking many of them (there can be many lines coming out of each operator). This structure is very efficient for computers and that is the reason that engineers and computer scientists are so used to it.

However, non technical people (and many technical people) are more used to a different structure: rather than saying "OR (A,B,C)", they rather say "A OR B OR C". This change makes a big difference in the easy to make a boolean expression. To applicant's knowledge, this approach has not been used before for creating queries, despite the fact that the problem of query formulation has been an issue for a long time.

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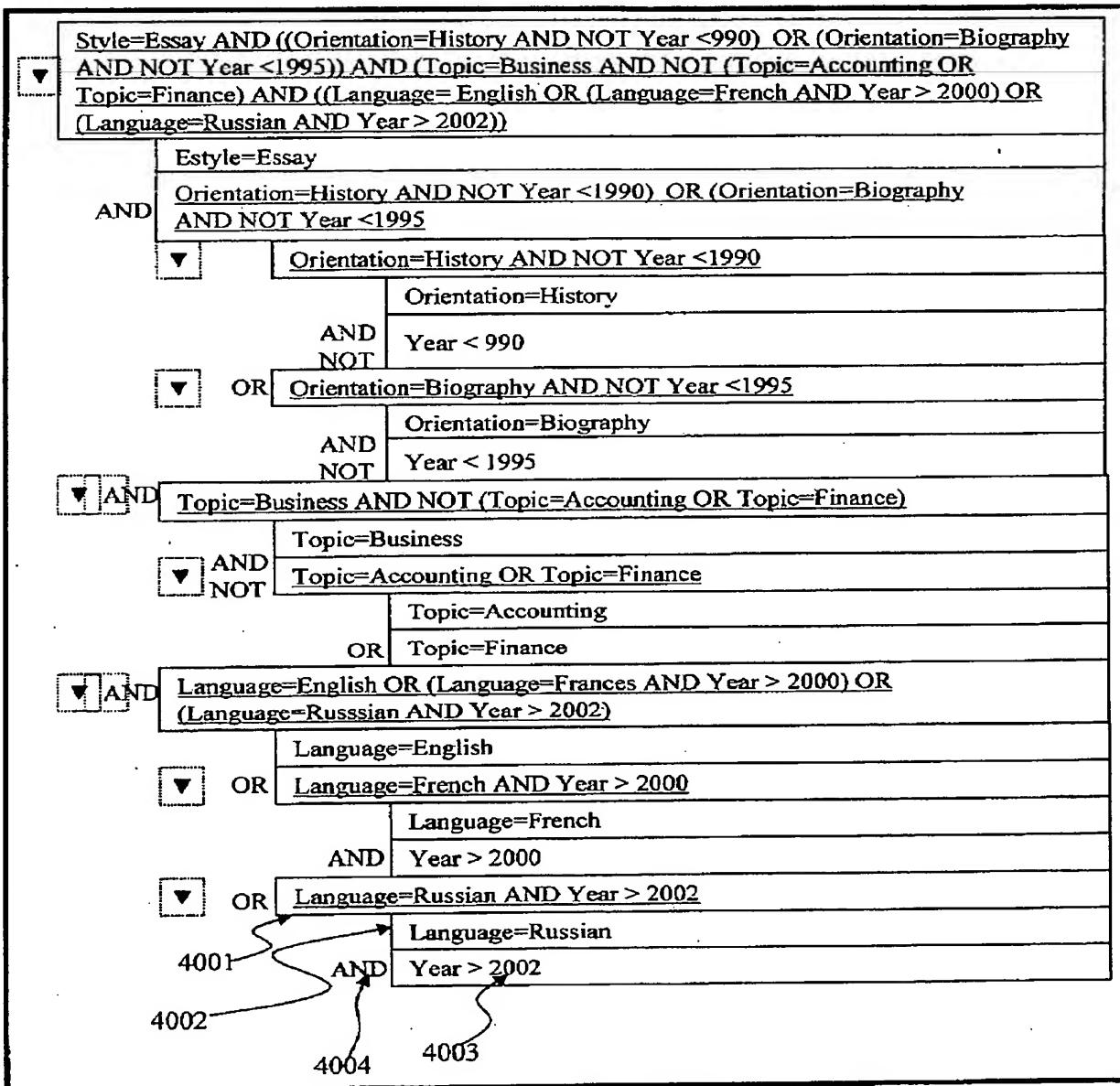
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Exhibit 2

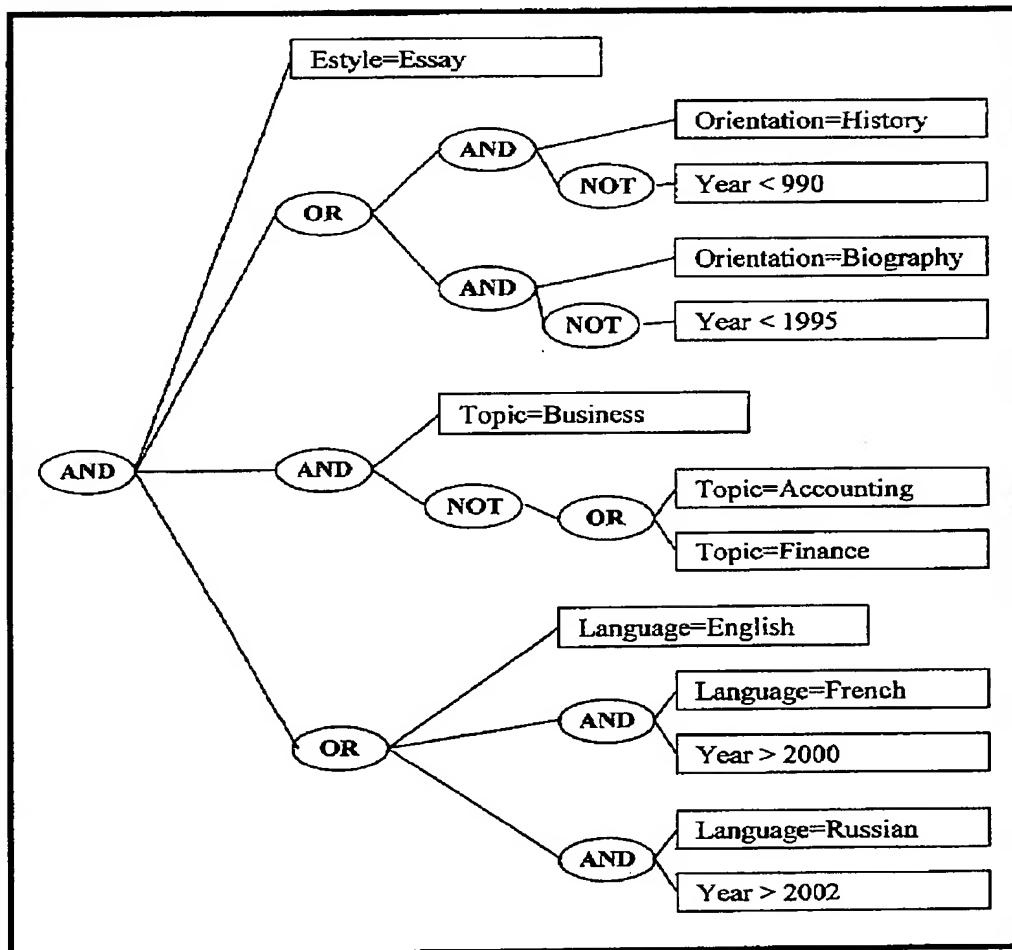


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## Exhibit 3



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## Exhibit 4

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## Exhibit 5

▼ Style=Essay AND ((Orientation=History AND NOT Year <1990) OR (Orientation=Biography AND NOT Year <1995)) AND (Topic=Business AND NOT (Topic=Accounting OR Topic=Finance) AND ((Language= English OR (Language=Frances AND Year > 2000) OR (Language=Russian AND Year > 2002)))

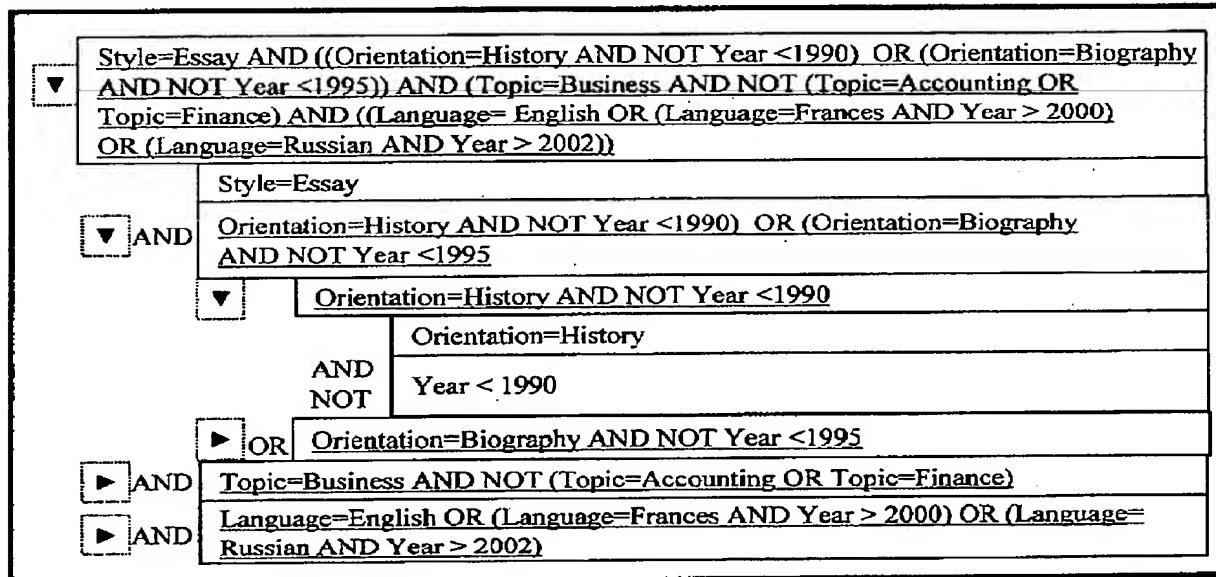
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► AND	<u>Topic=Business AND NOT (Topic=Accounting OR Topic=Finance)</u>
► AND	<u>Language= English OR (Language=Frances AND Year &gt; 2000) OR (Language=Russian AND Year &gt; 2002)</u>

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## Exhibit 6



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**CONCLUSION**

For all the above reasons, Applicant submit that the specification and claims are now in proper form, and that the claims define all define patentably over the prior art. Therefore they submit that this application is now in condition for allowance, which action they respectfully solicit.

**Conditional Request for Constructive Assistance**

Applicant has amended the specification and claims of this application so that they are proper, definite and define novel structure which is also unobvious. If, for any reason this application is not believed to be in full condition for allowance, applicant respectfully request the constructive assistance and suggestions of the Examiner pursuant to M.P.E.P. §2173.02 and §707.07(j) in order that the undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Very respectfully

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FIGURE 1

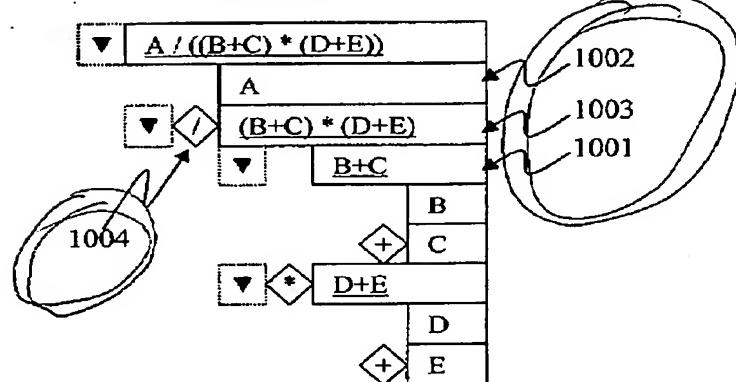


FIGURE 2

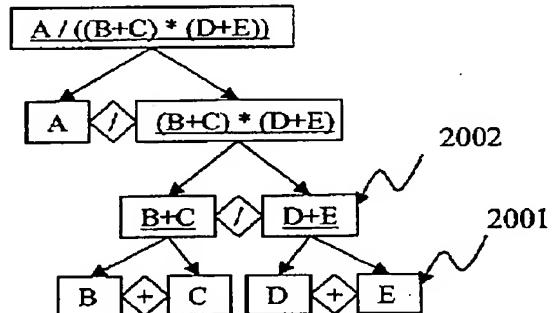


FIGURE 3

